



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/730,492	12/08/2003	Hung M. Pham	0315-000451/COL	2545

27572 7590 01/30/2007
HARNESS, DICKEY & PIERCE, P.L.C.
P.O. BOX 828
BLOOMFIELD HILLS, MI 48303

EXAMINER

BANKHEAD, GENE LOUIS

ART UNIT	PAPER NUMBER
----------	--------------

3744

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/30/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/730,492

Applicant(s)

PHAM ET AL.

Examiner

Gene L. Bankhead

Art Unit

3744

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 October 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 35-38, 40-44 and 47-64 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) 35-38, 40-44 and 47-64 is/are rejected..
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments, filed 04/24/06, with respect to the rejection(s) of claim(s) 35-38, 40-44, 47-50 and 51-64 under 35 USC 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Yoshiwa et al. (US 4,506,518) in view of Nagatomo et al. (US 4,494,383) in further view of Jaster et al. (US 5,435,145).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 35, 37, 42-43, 48 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al. in further view of Jaster (US 5435145). Yoshikawa discloses the invention substantially as claimed. Yoshikawa discloses a refrigeration system having a condenser 3, compressor 2, load sensor 43, liquid-side expansion valve 28 operated by a stepper motor 28 and controller 49,50 responsive to the load sensor for modulating both the compressor capacity and the expansion valve opening in order to provide the proper level of refrigeration. Nagatomo

Art Unit: 3744

teaches the use of a pulse width modulated variable capacity in order to provide adjustable compressor capacity for a refrigeration system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included the use of a pulse width modulated variable capacity compressor to provide the adjustable compressor capacity rather than the variable speed compressor in view of the teachings of Nagatomo. Yoshikawa in view of Nagatomo fail to teach applying the variable duty cycle control signal to both a compressor and valve of the system. Jaster teaches a refrigerant flow rate control system with a compressor 12 wherein the variable duty cycle is operated for both the compressor and valve. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yoshikawa in view of Nagatomo et al. with control system of Jaster in order to conserve overall energy expenditure of the system because one of ordinary skill in the art at the time of the invention would have known that operating the compressor and valve in one duty cycle together is more efficient than operating the compressor and valve using a duty cycle separately. In a duty cycle control system that the duty cycle time period will be shorter than the time constant of the load in order for the control system to work properly.

Claim 49 rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al. and Jaster as applied to claim 35 above, and further in view of Alsenz (5,035,119). Yoshikawa et al. in view of Nagatomo et al. and Jaster teach all limitations of claim 35 however fail to teach a pulsing solenoid valve. Alsenz teaches the use of pulsing a solenoid to operate an expansion valve. It would have

Art Unit: 3744

been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included the use of pulsing a solenoid to operate the expansion valve in order to vary the pressure and flow rate at which the refrigerant flows through the system according to system requirements instead of one steady pressure and flow rate, and thus increase system efficiency and conserve energy expenditure.

Claim 47 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al and Jaster as applied to claim 35 above, and further in view of Takizawa et al. Yoshikawa et al. in view of Nagatomo et al. and Jaster teach all limitations of claim 35 however fail to teach the use of a suction-side pressure regulator. Takizawa teaches the use of suction-side pressure regulator 14 in order to provide the proper level of refrigeration. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included use of a suction-side pressure regulator 14 in order to provide the proper pressure adjustment, and thus adjust the system compressor speed as one of ordinary skill in the art at the time the invention was made would have known compressor speed and suction side pressure of the refrigerant are related to system efficiency.

Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al and Jaster as applied to claim 35 above, and further in view of Tanaka. Yoshikawa et al. in view of Nagatomo et al. and Jaster teach

all limitations of claim 35 however fail to teach the use of capacity control in which cooling capacity is varied between hundred percent and zero percent. Tanaka teaches the used of capacity control in which cooling capacity is varied between hundred percent and zero percent. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included the use of capacity control in which cooling capacity is varied between hundred percent and zero percent to advantageously ensure cooling is done at one hundred percent capacity until needed and then stopped. This conserves energy expenditure as the system will only operate when needed and not provide cooling capacity in the intermediate capacity ranges continuously even when cooling is not necessary.

Claims 36 and 38, 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al and Jaster as applied to claim 35 above, further in view of Bendtsen. Yoshikawa et al. in view of Nagatomo et al. and Jaster teach all limitations of claim 35 however fail to teach the use of both temperature 8 and pressure 11 sensors for control of the capacity of a cooling system. Bendtsen teaches the use of both temperature 8 and pressure 11 sensors for control of the capacity of a cooling system. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included such that it included the use of both temperature and pressure sensors for control of the capacity of the cooling system as it is well known in the art

temperature and pressure sensors are directly related to the cooling performance of a refrigeration system. It is inherent that various parameters of a refrigeration system will have different rates of change.

Claims 51-53, 56-57, 59, 61-62 and 65-67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al and Jaster as applied to claim 35 above, and further in view of Schaeffer et al. Schaeffer teaches the use of a refrigeration system for cooling multiple refrigeration cases and the use of scroll compressors in refrigeration systems. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included the use of a refrigeration system to cool multiple refrigeration cases to be advantageously provide cooling for multiple cases from a central location rather than provide cooling to each individual case separately, thus increasing system efficiency. With respect to claim 66 it would have been obvious to one of ordinary skill in the art to use a scroll compressor as it is was well known in the art at the time the invention was made scroll compressors are more efficient and have better part load performance than reciprocating compressors.

Claims 54-55, 60, 63-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al, Jaster and Schaeffer et al teach all limitations of claim 51, however fail to teach the use of both temperature 8 and pressure 11 sensors for control of the capacity of a cooling system. Bendtsen teaches the use of both temperature 8 and pressure 11 sensors for control of the capacity of a cooling system. It would have been obvious to one of ordinary skill in the art at the time

Art Unit: 3744

the invention was made to have modified the system of Yoshikawa such that it included such that it included the use of both temperature and pressure sensors for control of the capacity of the cooling system as it is well known in the art temperature and pressure sensors are directly related to the cooling performance of a refrigeration system. It is inherent that various parameters of a refrigeration system will have different rates of change.

Claim 58 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshikawa et al in view of Nagatomo et al and Jaster teach all limitations of claim 51, however fail to teach the use of capacity control in which cooling capacity is varied between hundred percent and zero percent. Tanaka teaches the used of capacity control in which cooling capacity is varied between hundred percent and zero percent. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the system of Yoshikawa such that it included the use of capacity control in which cooling capacity is varied between hundred percent and zero percent to advantageously ensure cooling is done at one hundred percent capacity until needed and then stopped. This conserves energy expenditure as the system will only operate when needed and not cool in the intermediate ranges continuously even when cooling is not necessary.

Allowable Subject Matter

Claims 45-46 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of

Art Unit: 3744


the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gene L. Bankhead whose telephone number is (571)-272-8963. The examiner can normally be reached on 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571)-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


CHERYL TYLER
SUPERVISORY PATENT EXAMINER

Examiner
Art Unit 3744
GB